PB90-153735

Superfund Record of Decision (EPA Region 2) De Rewal Chemical, Hunterdon County, NJ (First Remedial Action), September 1989

(U.S.) Environmental Protection Agency, Washington, DC

29 Sep 89

U.S. Department of Commerce
National Technical Information Service
NTIS

50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO. EPA/ROD/R02-89/087	2.	3. Recipient's Accession No. PB 90 153735/AS
4. Title and Subtitle SUPERFUND RECORD OF DECISION De Rewal Chemical, NJ First Remedial Action - Final			5. Report Date 09/29/89 6.
7. Author(s)			8. Performing Organization Rept. No.
9. Performing Orgainization Name and Address			10. Project/Task/Work Unit No. 11. Contract(C) or Grant(G) No. (C) (G)
12. Sponsoring Organization Name and Address U.S. Environmental Protection Agency 401 M Street, S.W. Washington, D.C. 20460			13. Type of Report & Period Covered 800/000 14.

15. Supplementary Notes

16. Abstract (Limit: 200 words)

The De Rewal Chemical site is in Kingswood Township, Hunterdon County, New Jersey. The 3.7-acre site lies within the 100-year floodplain of the Delaware River and consists of a former dumping area, a garage, a private residence, and a building formerly occupied by the De Rewal Chemical Company. Between 1970 and 1973 the De Rewal Chemical Company reportedly manufactured and stored a textile preservative and an agricultural fungicide onsite. The State discovered De Rewal Chemical Company's improper chemical handling practices in 1972 but was unsuccessful in forcing the company to comply with permit requirements. The De Rewal Chemical Company continued to improperly dump chemicals onsite including one incident in which a tank truck containing 3,000 to 5,000 gallons of highly acidic chromium solution was allowed to drain onto the soil and eventually to the Delaware River. In 1973 the State ordered the company to excavate and place contaminated soil on an impermeable liner. The company reportedly only placed a portion of the contaminated soil on an uncovered plastic sheet before filing for bankruptcy. The primary contaminants of concern affecting the soil and ground water are VOCs including PCE, TCE, and toluene; other organics including PAHs; and metals including chromium and lead. (Continued on next page).

17. Document Analysis a. Descriptors

Record of Decision - De Rewal Chemical, NJ
First Remedial Action - Final
Contaminated Media: soil, gw
Key Contaminants: VOCs (PCE, TCE, toluene), other organics (PAHs), metals (chromium, lead)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 55
	20. Security Class (This Page) None	22. Price A04

(See ANSI-Z39.18) *See Instructions on Reverse*

OPTIONAL FORM 272 (4-77)
(Formerly NTIS-35)
Department of Commerce

PB90-153735

United States
Environmental Protection
Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R02-89/087
September 1989

EPA

Superfund Record of Decision:

De Rewal Chemical, NJ

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16. Abstract (Continued)

EPA/ROD/R02-89/087
De Rewal Chemical, NJ

The selected remedial action for this site includes excavation of 8,000 cubic yards of soil with onsite thermal treatment of 2,100 cubic yards of organic-contaminated soil followed by solidifying the soil and ash residue along with the remaining 5,900 cubic yards of inorganic-contaminated soil and onsite disposal; monitoring and controlling air emissions generated during thermal treatment; pumping and offsite treatment of ground water at an offsite industrial wastewater treatment facility; ground water monitoring; provision of a treatment system for the onsite residential well; temporarily relocating onsite residents; and preparing a cultural resources survey to ensure compliance with the National Historic Preservation Act. The estimated present worth cost for the selected remedial is $5,097,000, which includes O&M costs of $865,400.

N O T I C E

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DECLARATION STATEMENT

RECORD OF DECISION

DeRewal Chemical Company

SITE NAME AND LOCATION

DeRewal Chemical Company
Kingwood Township, Hunterdon County, New Jersey

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the DeRewal Chemical Company site, chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 and, to the extent applicable, the National Oil and Hazardous Substances Pollution Contingency Plan. This decision is based on the administrative record file for this site.

The State of New Jersey concurs with the selected remedy.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Record of Decision, may present a current or potential threat to public health, welfare, or the environment.

DESCRIPTION OF THE REMEDY

The remedy described in this document represents all planned activities for the site. It addresses contaminated soil and contaminated groundwater in the shallow aquifer underlying the site. In addition, the remedy includes post-remedial action monitoring of the deeper bedrock aquifer.

The major components of the remedial action are as follows:

- Excavation of soil contaminated with organic and inorganic compounds above action levels;
- On-site thermal treatment of the organic-contaminated soil;
- On-site solidification/stabilization of the thermally treated soil and the remaining inorganic-contaminated soil;

- Extraction of shallow groundwater contaminated above drinking water standards, on-site storage, and off-site disposal at an approved industrial wastewater treatment facility;

- Provision of a treatment system for the on-site residential well;

- Appropriate environmental monitoring to ensure the effectiveness of the remedy; and

- Establishment of deed restrictions, as necessary, to ensure the effectiveness of the remedy.

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable and satisfies the statutory preference for remedies that employ treatment that reduce toxicity, mobility, or volume as a principal element.

9-29-89
Date

William J. Muszynski, P.E.
Acting Regional Administrator

Decision Summary

DeRewal Chemical Company

Kingwood Township, New Jersey

SITE DESCRIPTION

The DeRewal Chemical Company site (Figure 1) is located in Kingwood Township, Hunterdon County, New Jersey. The 3.7-acre site lies one-half mile south of Frenchtown, between New Jersey State Route 29 to the east and the Delaware River to the west. A bike path, which is part of the Delaware and Raritan Canal State Park, divides the site into eastern and western portions. The site is located within the 100-year floodplain of the Delaware River, and its topography is flat to gently sloping toward the west.

Three buildings are located on the eastern half of the site: a private residence, a building formerly occupied by the DeRewal Chemical Company, and a garage. Two intermittent drainage ditches are located on the site, one east and one west of the bike path. The area north of the site is occupied by a small business, and the closest off-site residence is approximately 450 feet to the south. The population of Kingwood Township is approximately 3,000.

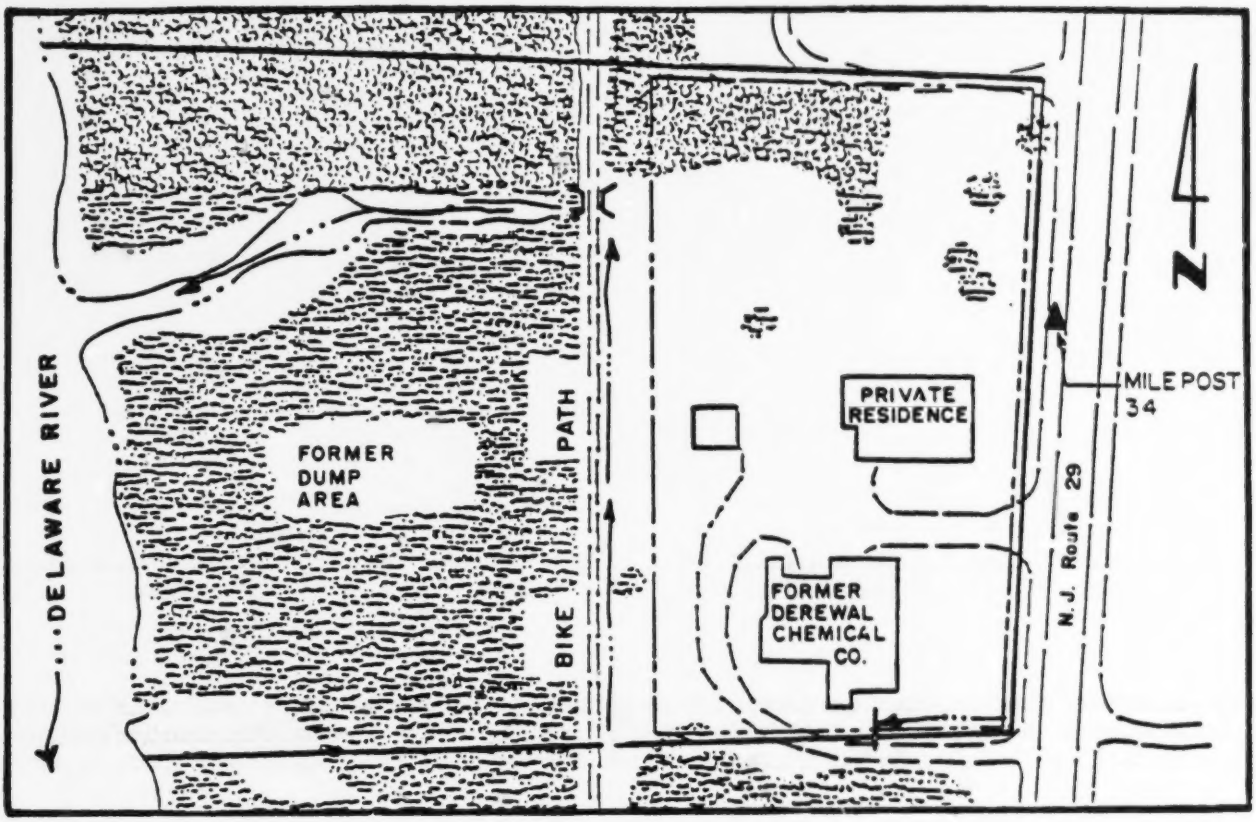
Hunterdon County, in general, depends on both surface and groundwater for its public water supply. Near the site, groundwater is the only potable source of water. At Frenchtown, the Delaware River is used for navigation and recreational purposes but is not used for public water supply. However, West Amwell Township, located approximately 12 miles downstream from the site, uses the Delaware River as the primary source of potable water. Groundwater in the vicinity of the site generally occurs in unconfined aquifers of recent river sediments or in the fractured bedrock aquifer of the Brunswick Formation.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

In 1970, Mr. Manfred DeRewal reached an agreement to lease the eastern portion of the site from the Flemington Block and Supply Company. It is believed that, from 1970 to 1973, the DeRewal Chemical Company manufactured a textile preservative and an agricultural fungicide and served as a warehouse for the storage and resale of chemicals. The first of a series of reports of improper chemical handling at the facility was received by the New Jersey Department of Environmental Protection (NJDEP) in 1972, which led to several unsuccessful attempts to force the company to abide by permit requirements. Numerous spills were

FIGURE 1

DEREWAL CHEMICAL CO. SITE



LEGEND

TREES, VEGETATION

PROPERTY LINE

DEREWAL CHEMICAL CO. SITE BOUNDARY

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reported in 1973, including one incident in which a tank truck containing a highly acidic chromium solution was allowed to drain onto the soil and eventually to the Delaware River. Inspectors estimated that the spill involved 3,000 to 5,000 gallons of what were believed to be plating wastes. In November 1973, the State of New Jersey ordered the DeRewal Chemical Company to excavate the contaminated soil and place it on an impermeable liner. It is believed that some soil was placed on plastic sheeting at the site, but was left uncovered and allowed to erode. In 1974, the DeRewal Chemical Company filed for bankruptcy.

The DeRewal Chemical Company site was proposed for addition to the National Priorities List (NPL) of Superfund sites in September 1983. After a public comment period, final listing was made in September 1984. Also in 1984, the site was inspected by a team of Environmental Protection Agency (EPA) and contractor personnel to evaluate the need for immediate removal of the contaminated soil. Immediate removal was not recommended. On April 28, 1985, soil samples were taken by NJDEP. Chromium, arsenic and nickel were found at concentrations above the background level.

The EPA began a remedial investigation and feasibility study (RI/FS) in June 1985 to determine the nature and extent of contamination at the DeRewal Chemical Company site. This study determined that contamination is present in the soil and the shallow groundwater above bedrock. The site is not contributing contamination to the surface waters that is detrimental to human health or the environment. Site-related sediment contamination exists at low concentrations and does not require remediation. Similarly, few contaminants were detected, and at low concentrations, in the water in the deeper bedrock aquifer at the site.

In June 1985, the EPA sent letters to Potentially Responsible Parties offering them the opportunity to undertake cleanup activities. None of these parties agreed to participate. In November 1988, the EPA sent an information request letter, pursuant to 42 U.S.C. §9604 and 42 U.S.C. §6927, to the owner of the area of the site east of the bike path. The EPA received no response to this letter. On March 15, 1989, pursuant to an administrative subpoena issued by EPA Region III, Manfred DeRewal was deposed by representatives of EPA Regions II and III. In June 1989, the EPA sent 16 information request letters, pursuant to 42 U.S.C. §9604 and 42 U.S.C. §6927, to potential waste transporters and waste generators and to Manfred DeRewal. EPA is currently assessing the responses that it has received to date.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The RI report was released to the public in October 1988. The FS report and the Proposed Plan, which identified the EPA's

preferred remedial alternatives, were released on July 25, 1989 and July 27, 1989, respectively. The documents were made available to the public at information repositories maintained at the Kingwood Township Municipal Building and the Hunterdon County Library. The public comment period was held from July 28, 1989 through August 28, 1989. A public meeting was held on August 10, 1989 to present the findings of the study and the Proposed Plan, and to solicit public input. The issues raised at the public meeting and during the comment period are addressed in the Responsiveness Summary, which is part of this Record of Decision. This decision document presents the selected remedial action for the DeRewal Chemical Company site, chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act and, to the extent applicable, the National Contingency Plan. The decision for this site is based on the administrative record.

SCOPE OF RESPONSE ACTION

This Record of Decision (ROD) addresses all planned activities for the site. It documents the selected remedies for the remediation of the soil and shallow water-bearing zone. Inorganic contaminants were detected in the bedrock aquifer at slightly elevated concentrations. At present, the bedrock aquifer does not require remediation. However, it will be periodically monitored prior to the start of the remedial action, as well as during and after the remedial action. Monitoring of the bedrock aquifer after the completion of the cleanup will indicate the need for any further action.

SUMMARY OF SITE CHARACTERISTICS

A remedial investigation was conducted at the DeRewal Chemical Company site to determine the type and concentrations of contaminants in the various media at the site, and in the near vicinity of the site. Samples were collected from sediments deposited along natural surface water runoff pathways, surficial soil to depths of up to two feet, and subsurface soil at varying depths to the bedrock. Water samples were collected from surface runoff from natural runoff pathways, the Delaware River, and shallow and deep groundwater wells. Details of these sampling efforts may be found in the remedial investigation and feasibility study reports.

Origin of Contamination

Chemicals handled by the DeRewal Chemical Company included copper aluminum sulfate, ammonia, micronutrients (containing copper, iron, zinc and manganese) used in fertilizers, a textile preservative, acrylic acid, lime, ferric chloride, chromic acid, and chromium and copper etching solutions.

Soils

Surficial soil samples (0-2 feet) and subsurface samples (2-14 feet) were collected. A summary of soil data is presented in Table 1. Areas of contamination have been separated as those east of the bike path and those west of the bike path. The tables also show the NJDEP soil action level for the contaminants found.

Surficial soil is contaminated with volatile organic compounds (VOCs), semi-volatile organics [mostly polycyclic aromatic hydrocarbons (PAHs)], and metals. VOCs were detected, above and below action levels, throughout the site. Soil samples exceeding the action level for total VOCs were found in the southern portion of the site on both sides of the bike path. The contaminants frequently detected include trichloroethene, tetrachloroethene and toluene. None of the samples collected below a depth of 0-2 feet exceeded the action level for total volatile organics.

Semi-volatile organics, including PAHs, were found mainly in the surface soils. Contaminants frequently detected include fluoranthene, pyrene, and Benzo (B) fluoranthene. Although some semi-volatiles were detected in the subsurface soil, no samples below two feet exceed the action level for total semi-volatile organics.

Metals were found east and west of the bike path in both surface and subsurface soils. Metals frequently detected include chromium, copper, lead and zinc. Unlike the total volatile and semi-volatile contaminants, metals were found below a two foot dep[illegible] in concentrations exceeding NJDEP action levels.

Estimates for the volume of soil which has contamination greater than the NJDEP action levels are summarized in Table 2.

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TABLE 1

SOIL SAMPLING SUMMARY OF DATA

(All readings in ng/kg)

COMPOUND	NJDEP ACTION LEVEL	EAST OF BIKE PATH			
		SURFICIAL SAMPLES		SUBSURFACE SAMPLES	
		MAXIMUM CONCENTRATION	PERCENT OF SAMPLES > NJDEP #	MAXIMUM CONCENTRATION	PERCENT OF SAMPLES > NJDEP #
INORGANICS					
Cadmium	3	199	16	ND	0
Chromium (Total)	100	1270	24	464	8
Copper	170	4160	22	939	5
Cyanide	12	304	4	12	2
Lead	250	783	4 ##	16	0
Mercury	1	2.5	6	0.7	0
Nickel	100	297	6	51	0
Selenium	4	ND	0	ND	0
Silver	5	6.5	2	2.5	0
Zinc	350	2380	14	507	2
Hexavalent Chromium	none set	5.5	14	13	37
ORGANICS					
Total Volatile Organics (TVO)	1	31.5	12	0.37	8
Total Semi-volatile Organics	10	146.97	14	12 8	2
Total Carcinogenic PAHs ##	none set	74.9	68	4.9	3

NOTES

\# Percent of samples which contain chemical concentrations that exceed the NJDEP action levels, except hexavalent chromium and carcinogenic PAHs. Hexavalent chromium and total carcinogenic PAHs are calculated on the basis of the total number of detections.

\## Both detections greater than the NJDEP action level are from the same location.

8 Maximum value for total semi-volatile organics from east and west of the bike path is from the same location.

Total carcinogenic PAHs is a sub-category of total semi-volatile organics.

ND None detected.

TABLE 1 (continued)
SOIL SAMPLING
SUMMARY OF DATA
(All readings in mg/kg)

COMPOUND	NJDEP ACTION LEVEL	WEST OF AND INCLUDING THE BIKE PATH			
		SURFICIAL SAMPLES		SUBSURFACE SAMPLES	
		MAXIMUM CONCENTRATION	PERCENT OF SAMPLES > NJDEP #	MAXIMUM CONCENTRATION	PERCENT OF SAMPLES > NJDEP #
INORGANICS					
Cadmium	3	10	17	ND	0
Chromium (Total)	100	100	3	279	6
Copper	170	201	6	62	0
Cyanide	12	11	0	ND	0
Lead	250	197	8	14	0
Mercury	1	0.5	0	0.2	0
Nickel	100	84	0	30	0
Selenium	4	7.1	8	ND	0
Silver	5	12	8	ND	0
Zinc	350	5050	33	458	3
Hexavalent Chromium	none set	ND	0	12	26
ORGANICS					
Total Volatile Organics (TVO)	1	5.18	25	0.45	0
Total Semi-volatile Organics	10	66.14	8	12.8	3
Total Carcinogenic PNAs ##	none set	32.10	29	1.50	10

NOTES

\# Percent of samples which contain chemical concentrations that exceed the NJDEP action levels, except hexavalent chromium and carcinogenic PNAs. Hexavalent chromium and total carcinogenic PNAs are calculated on the basis of the total number of detections.

Both detections greater than the NJDEP action level are from the same location.

* Maximum value for total semi-volatile organics from east and west of the bike path is from the same location.

\#\# Total carcinogenic PNAs is a sub-category of total semi-volatile organics.

ND None detected.

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Table 2. SOIL CONTAMINATION

Depth (feet)	Contaminants	Estimated Volume (CY)
0-2	Organics only	1,100
	Organics+Inorganics	1,000
	Inorganics	800
	SUBTOTAL	2,900
2-14	Inorganics only	5,100
	TOTAL	8,000

Groundwater

Groundwater was sampled from the monitoring wells and boreholes, which were installed at the site (Figure 2). Groundwater samples were also collected from residential wells. Groundwater samples were collected in two phases, and the results of the analyses are found in Tables 3 through 7.

Two water-bearing zones were identified at the site: a shallow water-bearing zone and a bedrock aquifer. The shallow water-bearing zone located in the sand and gravel immediately above the bedrock appears to contain little water, particularly west of the bike path (see Figure 2). The shallow water-bearing zone is not a source of potable water in the surrounding area. Water level data from the shallow groundwater wells indicate that groundwater flows toward the west.

The shallow groundwater zone is contaminated with organics and metals which exceed New Jersey Safe Drinking Water Act Maximum Contaminant Limits (NJ SDWA MCLs) in most locations. Organic contaminants of concern include trichloroethene, tetrachloroethene, 1,2-dichloroethene (total), methylene chloride and 1,1,1-trichloroethane. Metals of concern include chromium, copper, lead, nickel and zinc.

Contamination in the bedrock aquifer ranges from below to slightly above the NJ SDWA MCLs as shown in Tables 3, 4 and 6. Contaminants of concern include: trichloroethene, tetrachloroethene and cadmium. The latest round of sampling of the bedrock aquifer did not detect any organic contaminants at concentrations exceeding ARARs.

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TABLE 3

GROUNDWATER SAMPLING
RI PHASE I - ORGANICS

(All readings in ug/l)

	NJ SDWA* MCL	RESIDENTIAL WELL						DEEP WELL			SHALLOW WELL		
SAMPLE LOCATION		RW-1	RW-2-1	RW-2-2	RW-3	RW-4	RW-5	MW-1	MW-2	MW-5	MW-4	MW-6	MW-7
COMPOUND SAMPLE NO.		BH 496	BH 497	BH 498	BH 502	BH 499	BH 500	BH 505	BH 506	BH 501	BH 507	BH 509	BH 508
1,1-DICHLOROETHENE	2							3.9					
TRANS-1,3,-DICHLOROETHENE	-										270	170	69
1,1,1-TRICHLOROETHANE	26			0.7				7.1					
TRICHOLOROETHENE	1						1.6	8.4			1000	15000	180
TETRACHLOROETHENE	1							13.1			130		4.60
TOTAL XYLENES	44												1.40
1,2-DICHLOROBENZENE	600										1		1.70
2,4,5-TRICHLOROPHENOL	-										3.10		
BIS(2-ETHYLHEXYL) PHTHALATE	-									2.80			

* Safe Drinking Water Act Maximum Contaminant Levels

"-" No standard available

TABLE 4

GROUNDWATER SAMPLING
RI I PHASE II - ORGANICS

(All readings in ug/l)

	NJ SDWA	DEEP WELL			SHALLOW WELL					BLANK	
SAMPLE LOCATION	MCL	MW-1	MW-2	MW-5	MW-4	MW-3	MW-6	MW-7	BH-4 (WP)	TB-2	FB-2
COMPOUND SAMPLE NO.	-	BJ451	BJ452	BJ455	BJ454	BJ453	BJ456	BJ457	BJ458	BJ468	BJ469
Methylene Chloride (75-09-2)	2	RB			RB		920	R		RB	RB
Acetone (67-64-1)	-	RB	RB		RB		1600 J		R	RB	RB
1,2-Dichloroethene (Total) (540-59-0)	-				180		700 J	12			
Trichloroethene (79-01-6)	1				440		34000	75	2.7 J		
Tetrachloroethene (127-18-4)	1	3.5 J			28			7.5	3.3 J		
Toluene (108-88-3)	-		R						R		R

DATA QUALIFIERS

R - Data value rejected because quality control criteria were not met.

B - Compound was detected in the blank

J - Estimated value because the amount detected is below the required limits or because quality control criteria were not fully met.

"-" No standard available

TABLE 5

GROUNDWATER SAMPLING
RI II - VOLATILE ORGANICS

(All readings in ug/l)

SAMPLE NUMBER / COMPOUND / SAMPLE NO.	NJ SDWA MCL	BH-12 80084	BH-12-2 80086	MW-12 80087	MW-13 80085	FIELD BLANK 80083	TRIP BLANK 80082
Methylene Chloride (75-09-2)	2					7 B	7 B
Acetone (67-64-1)	-					440 BE	9 BJ
1,1-Dichloroethene (75-35-4)	2	15	16	19			
1,1-Dichloroethane (75-35-3)	-	9	10				
1,2-Dichloroethene (Total) (540-59-0)	-	450	460	440			
Chloroform (67-66-3)	-		7				
1,1,1-Trichloroethane (71-55-6)	26	410		180			
Trichloroethene (79-01-6)	1	6100	3200	5400			
Tetrachloroethene (127-18-4)	-	5	5	36	5		

DATA QUALIFIERS

B - Compound was detected in the blank

J - Estimated quantity because amount detected was below required limits or quality control criteria were not met.

E - Value estimated or not reported due to presence of interference.

"-" No SDWA MCL available.

TABLE 6

GROUNDWATER SAMPLING
RI I PHASE II - INORGANICS

(All readings in ug/l)

		DEEP WELL					
SAMPLE LOCATION	NJ SDWA	MW-1(U)	MW-1(F)	MW-2(U)	MW-2(F)	MW-5(U)	MW-5(F)
COMPOUND SAMPLE NO.	MCL	MBK907	MBK908	MBK909	MBK910	MBK915	MBK916
Aluminum [7429-90-5]	-	885	[126]	244		461	
Barium [7440-39-3]	1000	206	[198]	346	310	263	238
Cadmium [7440-43-9]	10*	40					
Calcium [7440-70-2]	-	34200	36500	39000	35000	33700	30800
Chromium [7440-47-3]	50	27	15	[5.1]	15	19	19
Copper [7440-50-8]	-	43		31	[23]	39	49
Iron [7439-89-6]	-	1250		226		677	137
Lead [7439-92-1]	50	R				R	
Magnesium [7439-95-4]	-	11600	12100	12800	11600	12600	11700
Manganese [7439-96-5]	-	97				65	
Mercury [7439-97-6]	2			3.4			
Nickel [7440-02-2]	13.4					[16]	
Potassium [7440-09-7]	-	[582]					
Silver [7440-22-4]	50		[9.6]				
Sodium [7440-23-5]	-	8830	7650	15100	17400	8430	8260
Vanadium [7440-62-2]	-		[11.6]				
Zinc [7440-66-6]	-	187	32		26	33	33

DATA QUALIFIERS

R - Data value rejected because quality control criteria were not met.

[ ] - If the result is a value greater than or equal to the instrument detection limit but less than the contract required detection limit, the value is reported in brackets (i.e., [101]).

TABLE 6 (CONTD.)

GROUNDWATER SAMPLING
RI I PHASE II - INORGANICS

(All readings in ug/l)

SAMPLE LOCATION	NJ SDWA	SHALLOW WELL										BLANK	
		MW-3(D)	MW-3(F)	MW-4(D)	MW-4(F)	MW-6(D)	MW-6(F)	MW-7(D)	MW-7(F)	BH-4WP(D)	BH-4WP(F)	FB-2	TB-2
COMPOUND SAMPLE NO.	MCL	MBK911	MBK912	MBK913	MBK914	MBK917	MBK918	MBK919	MBK920	MBK921	MBK922	MBK926	MBK925
Aluminum (7429-90-5)	-	11300		3490		1750	468	1970		4720	[103]		
Barium (7440-39-3)	1000	213	[75]	[127]	[79]	[144]	[67]	2380	[130]	[181]	[70]		
Cadmium (7440-43-9)	10							20	[4.6]				
Calcium (7440-70-2)	-	19600	14400	62300	61100	32300	32700	70500	55300	36900	32800		
Chromium (7440-47-3)	50	5030	17	26	10	155	24	27	25	107	30		
Cobalt (7440-48-4)	-	[23]				[22]	[10]	[11]					
Copper (7440-50-8)	-	161		40	[24]	112	53	61	38	113	31	[24]	[19]
Iron (7439-89-6)	-	33700		5210		24900	687	138000		6810			
Lead (7439-92-1)	50	R		R		R		R		61			
Magnesium (7439-95-4)	-	11300	5980	19900	19300	9340	7330	18700	16600	9430	7550		
Manganese (7439-96-5)	-	496	70	1220	944	8150	8660	8980	3740	100			
Mercury (7439-97-6)	2												
Nickel (7440-02-2)	13.4	758	138	[21]		189	136	56		[36]	[14.6]		
Potassium (7440-09-7)	-	[2690]	[734]	[4160]	[3340]	[2880]	[1070]	5030	[4580]	[2010]	[1090]		
Silver (7440-22-4)	50						[9.1]						
Sodium (7440-23-5)	-	13900	12000	21200	20600	15800	14000	17800	15100	18800	14500		
Vanadium (7440-62-2)	-	[37]		[15]		[25]		[42]		[16]			
Zinc (7440-66-6)	-	107	46	44	43	79	41	60	22	42	32		

DATA QUALIFIERS

R - Data value rejected because quality control criteria were not met.

[ ] - If the result is a value greater than or equal to the instrument detection limit but less than the contract required detection limit, the value is reported in brackets (i.e., [10]).

TABLE 7

GROUNDWATER SAMPLING
RI II - INORGANICS

(All readings in ug/l)

SAMPLE LOCATION	NJ SDWA MCL	MW-12	BH-12	BH-12-2	FB
COMPOUND / SAMPLE NO.		MBN164	MBN167	MBN165	MBN157
Barium (7440-39-3)	1000	226	(131)	(176)	
Cadmium (7440-43-9)	10	15		6.2	
Calcium (7440-70-2)	-	55900	53500	52400	
Chromium (7440-47-3)	50	54	70	70	
Cobalt (7440-48-4)	-	(18)			
Copper (7440-50-8)	-	98	47	48	(16)
Iron (7439-89-6)	-	6900			
Lead (7439-92-1)	50	113	9.5	14	(2.8)
Magnesium (7439-95-4)	-	17500	15700	16600	
Manganese (7439-96-5)	-	935			
Nickel (7440-02-2)	13.4	44		(15)	
Potassium (7440-09-7)	-	10400	(1000)	(3100)	
Sodium (7440-23-5)	-	27000	15300	14700	
Vanadium (7440-62-2)	-	(12)		(11)	
Zinc (7440-66-6)	-	323 J	53 J	63 J	

DATA QUALIFIERS

J - Estimated value because the amount detected is below the required limits or because quality control criteria were not fully met.

( ) - If the result is a value greater than or equal to the instrument detection limit but less than the contract required detection limit, the value is reported in brackets (i.e., (101)).

"-" - No standard available.

As previously stated, there are two distinct bodies of groundwater at the site; a shallow water-bearing zone and a bedrock aquifer. The shallow water-bearing zone consists of recent fluvial deposits. Groundwater present in this zone is discontinuous across the site and is generally contained in depressions formed by the hummocky bedrock topography. The upper water-bearing zone is separated from the bedrock topography by a low permeability saprolite layer formed of weathered bedrock material. The bedrock aquifer is comprised of the Triassic age Brunswick shale. Groundwater flow in the bedrock is primarily controlled by fracture systems. To date, no data has been collected that identifies a strong connection between the shallow water-bearing zone and the deeper bedrock aquifer at the site.

Surface Water

Surface water samples were collected from the Delaware River at eight locations, including areas upstream, downstream, and adjacent to the site. Adjacent sampling locations are shown on Figure 3.

Surface water runoff from the site does not appear to affect the water quality of the Delaware River. Surface water samples taken near northern and southern site boundaries, including a ditch which drains the site, contain approximately the same concentrations as background samples taken upstream.

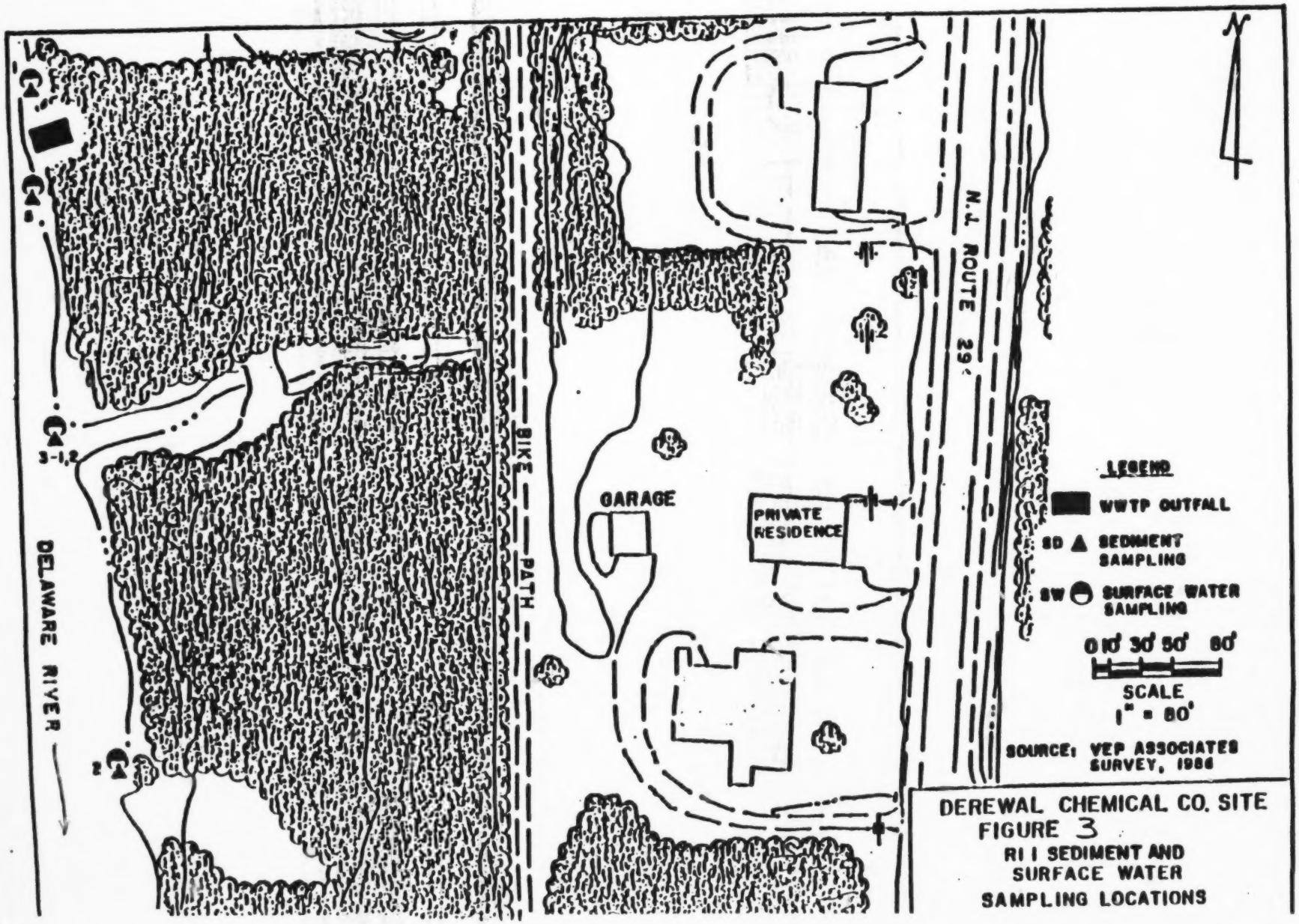
Sediment

Sediment samples were collected along the eastern bank of the Delaware River (Figure 3). Analyses reveal that contaminants are present only in the sediment immediately adjacent to the site. Table 8 summarizes the results of the sampling.

There are no promulgated standards, or cleanup criteria, for sediments. However, based on the risk assessment performed for the site, the sediments do not pose a threat to human health. Further, the feasibility study determined that the adverse impact on the local environment associated with a remedial measure addressing these sediments would be significant enough to outweigh the benefits of such an action. Therefore, sediment cleanup is not included in the scope of the response action.

Potential Routes of Human and Environmental Exposure

As shown on Figure 1, there is a private residence at the site. The occupants currently include the owner of the portion of the site east of the bike path, and tenants. Under current land-use conditions at the site and neighboring areas, the principal exposure pathways through which humans might potentially be exposed to site contaminants are through groundwater, and direct contact with contaminated soil.



DEREWAL CHEMICAL CO. SITE

FIGURE 3

RI I SEDIMENT AND SURFACE WATER SAMPLING LOCATIONS

A potential route of environmental exposure is a pathway by which an individual, population, community or ecosystem might encounter the chemicals of potential concern. Exposure pathways may be direct or indirect in nature. Direct pathways would be dermal contact, inhalation, or ingestion of contaminated media such as soil, sediment, water, or air. Indirect pathways, for the purposes of the assessment conducted for the site, are those in which an animal is exposed through the food chain (i.e., consumes other previously contaminated organisms). Some of the metals and organic compounds may bioaccumulate to some extent and, therefore, exposure via the food chain is possible.

SUMMARY OF SITE RISKS

CERCLA directs that the EPA must protect human health and the environment from current and potential exposure to hazardous substances at the site. In order to assess the current and potential risks from this site, a risk assessment was conducted as part of the remedial investigation. This section summarizes the Agency's findings concerning the risks from potential exposure to groundwater, direct contact with contaminated soil, and direct and indirect routes of environmental exposure.

Human Health Risks

Exposure Assessment

The water in the bedrock aquifer is a current source of drinking water; it is classified as Class IIA based on the Agency's Groundwater Classification Strategy. The on-site residents use an on-site well for their domestic water needs. In developing the hypothetical exposure scenarios for groundwater at the site, it was assumed that each well in the lower aquifer could be hydraulically connected to the contaminated shallow groundwater. It was further assumed that future concentrations of chemicals of concern in residential or municipal wells would be similar to concentrations currently detected in the shallow monitoring wells. In the scenario consisting of direct contact with contaminated soil, exposure was evaluated for soil east of the bike path, and west of and including the bike path.

TABLE 8

SUMMARY OF SEDIMENT SAMPLING DATA

VOLATILE ORGANICS (ug/kg)

COMPOUND / SAMPLE NO.	SD-1	SD-2	SD-3-1 **	SD-3-2 **	SD-4	SD-5
Methylene Chloride				23 B		
Acetone		160 B	180 B			
1,1-Dichloroethane		2.1 J				
Trans-1,2-Dichloroethene		15				
2-Butanone	22					12 J
1,1,1-Trichloroethane		3.4 J				
Trichloroethene		110				
Benzene	3.4 J		2.4 J	2.1 J	4.4 J	
Tetrachloroethene		390				3.7 J
Toluene	53	190 B	11	10	32	50 B

(continued)

TABLE 8 (continued)

SUMMARY OF SEDIMENT SAMPLING DATA

SEMI-VOLATILE ORGANICS (ug/kg)

COMPOUND / SAMPLE NO.:	SD-1	SD-2	SD-3-1 **	SD-3-2 **	SD-4	SD-5
1,2-Dichlorobenzene			92 J			
2-Methylphenol			110 J	81 J		
Naphthalene			58 J			
N-Nitrosodiphenolamine			53 J			
Phenanthrene	530 J	920 J	340	310 J	500 J	410 J
Anthracene			96 J	92 J		
Di-N-Butyl Phthalate		300 J	65 J	51 J		
Fluoranthene	1300 J	1700	810	840	1000 J	930 J
Pyrene	870 J	1200 J	410	460 J	590 J	970 J
Benzo(A) Anthracene	410 J	850 J	350	490 J	540 J	630 J
Bis(2-Ethylhexyl) Phthalate		520 JB		460 JB	420 JB	500 JB
Chrysene	660 J	770 J	57 J	440 J	600 J	610 J
Di-N-Octyl Phthalate				74 J		
Benzo(B) Fluoranthene	550 J	630 J	410	440 J		550 J
Benzo(K) Fluoranthene	600 J	660 J	330	310 J		530 J
Benzo(A) Pyrene	620 J	750 J	130 J	410 J	500 J	550 J
Indeno(1,2,3-CD) Pyrene			230 J	220 J		
Benzo(GHI) Perylene				170 J		
Arochlor-1254						4600 *

(continued)

TABLE 8 (continued)

SUMMARY OF SEDIMENT SAMPLING DATA

INORGANICS (mg/kg)

COMPOUND / SAMPLE NO.	SD-1	SD-2	SD-3-1 **	SD-3-2 **	SD-4	SD-5
Aluminum	8970	9470	5700	5090	7470	12900
Barium	[85]	[91]	[61]	[60]	[97]	[158]
Beryllium	[1.2]	[1.1]	[0.93]		[1.1]	7.6
Cadmium	[4]				[4]	
Chromium	22	146	22	17	19	44
Copper	29	159	27	24	30	78
Iron	25700	21700M	16200M	15300M	16700M	27700M
Lead	49	74	40	38	46	124
Manganese	352	301M	203M	194M	356M	208M
Nickel	[34]	52	[29]	[27]	[28]	[30]
Zinc	354	326	271	240	357	529
Cyanide	1.31	1.31	0.86	1.28	1.46	2.34

NOTES

B: Compound was detected in the blank.
[ ]: If the result is a value greater than or equal to the instrument detection limit but less than the contract required detection limit.
M: Duplicate analysis was not within control.
**: Duplicate samples from the same location.
J: Estimated amount due to interferences during analysis.

Toxicity Assessment

Cancer potency factors (CPFs) have been developed by EPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. CPFs, which are expressed as the reciprocal of milligrams per kilogram-day [(mg/kg-day)$^{-1}$], are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper bound" reflects a conservative estimate of the risks calculated from the CPF. Use of this approach makes underestimation of the actual cancer risk highly unlikely. Cancer potency factors are derived from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied (i.e., to account for the use of animal data to predict effects on humans).

Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects caused by exposure to chemicals exhibiting noncarcinogenic effects. RfDs, which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals. Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied. These uncertainty factors help ensure that the RfDs will not underestimate the potential for adverse noncarcinogenic effects to occur.

CPFs and estimated intake levels for carcinogenic chemicals found in the groundwater at the DeRewal site are provided in Table 9. Table 9 also provides RfDs and estimated intake levels for chemicals in the groundwater which exhibit noncarcinogenic effects.

CPFs and estimated intake levels for carcinogens in the soil at the DeRewal site, east of the bike path and west of and including the bike path, are found in Tables 10 and 11, respectively. Tables 10 and 11 also provide RfDs and estimated intake levels for chemicals in the soil which exhibit noncarcinogenic effects.

Risk Characterization

Excess lifetime cancer risks are determined by multiplying the intake level with the cancer potency factor. These risks are probabilities that are generally expressed in scientific notation (e.g., $1x10^{-6}$ or 1E-6). An excess lifetime cancer risk of $1x10^{-6}$ indicates that, as a plausible upper bound, an individual has a

one in one million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions at a site.

Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as the hazard quotient (HQ) (i.e., the ratio of the estimated intake derived from the contaminant concentration in a given medium to the contaminant's reference dose). By adding the HQs for all contaminants within a medium or across all media to which a given population may reasonably be exposed, the Hazard Index (HI) can be generated. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media.

Excess lifetime cancer risks associated with the carcinogens in the groundwater are provided in Table 9. Table 9 also provides the HQs for the noncarcinogens in the groundwater, as well as the Hazard Index. In general, the upperbound risk estimated for the groundwater is $3X10^{-5}$. While this risk is within the acceptable range, contaminants were found in concentrations exceeding the SDWA MCLs, and therefore, cleanup is warranted.

Excess lifetime cancer risks associated with direct contact to soils east of the bike path and west of and including the bike path are provided in Tables 10 and 11, respectively. Tables 10 and 11 also provide the HQs associated with the noncarcinogens in the soil, as well as the Hazard Index. In summary, the upperbound risk associated with the soil, under the conditions and assumptions of the maximum exposure scenario, is $2X10^{-3}$.

Environmental Risks

Environmental Assessment

Potential environmental impacts of the chemicals of concern at the site also were evaluated. Plant and animal species potentially exposed to the chemicals of concern at the site were identified. Absolute conclusions regarding the potential environmental impacts of the site cannot be made because there are many uncertainties surrounding the estimates of toxicity and exposure. However, given the available data and the associated limitations, several general conclusions regarding the potential for environmental impacts are presented below.

The maximum concentrations of cadmium, chromium, cobalt, selenium and zinc in the site soil exceed levels known to be phytotoxic based on acute toxicity studies of soybeans, bean leaves, rice, wheat and barley, respectively. These species were used in the evaluation of the phytotoxicity because data was available for these species. No studies were performed to assess the specific terrestrial plant life at the DeRewal Chemical Company site in

TABLE 9

DAILY INTAKES AND RISKS ASSOCIATED WITH EXPOSURE TO GROUNDWATER
DEREWAL SITE, FRENCHTOWN, NEW JERSEY

Carcinogens	Water Concentrations (mg/liter)	Daily Intake from Ingestion (mg/kg/day)	Daily Intake from Showering (mg/kg/day)	Total Chronic Daily Intake (CDI) (mg/kg/day)	Potency Factor (mg/kg/day)-1	Risk (Upperbound)
Tetrachloroethene	1.3E-02	3.7E-04	1.6E-04	5.3E-04	5.1E-02 (B2)	3E-05
Trichloroethene	8.4E-2	2.4E-04	1.1E-04	3.5E-04	1.1E-02 (B2)	3E-06
Total						3E-05

Noncarcinogens	Water Concentrations (mg/liter)	Daily Intake from Ingestion (mg/kg/day)	Daily Intake from Showering (mg/kg/day)	Total Chronic Daily Intake (CDI) (mg/kg/day)	Reference Dose (RfD) (mg/kg/day)	CDI:RfD Ratio (CDI/RfD)
Chromium (hexavalent)	2.5E-02	7.1E-04	NEG	7.1E-04	5.0E-03	1E-01
Tetrachloroethene	1.3E-02	3.7E-04	1.6E-04	5.3E-04	2.0E-02	3E-02
1,1,1-Trichloroethane	7.1E-03	2.0E-04	9.7E-05	3.0E-04	8.6E-02	3E-03
Hazard Index						<1(1E-01)

NEG = assumed to be negligible.

TABLE 10

DAILY INTAKES AND RISKS ASSOCIATED WITH DIRECT CONTACT TO SOILS EAST OF THE BIKE PATH
DEREWAL SITE, FRENCHTOWN, NEW JERSEY

A. CARCINOGENS

Chemical	Soil Concentrations (mg/kg)		Quantity of Chemical Ingested (mg/kg/day)		Quantity of Chemical Absorbed Dermally (mg/kg/day)		Chronic Daily Intake Prorated Over 70-Year Lifetime		Potency Factor (mg/kg/day)-1	Risk (Upperbound)	
	Average Case	Maximum Plausible Case	Average Case	Maximum Plausible Case	Average Case	Maximum Plausible Case	Average Case	Maximum Plausible Case		Average Case	Maximum Plausible Case
Bis(2-ethylhexyl)phthalate	NR	74	NA	5.6E-04	NA	2.1E-04	NA	1.8E-04	0.00068	NA	1E-07
Chloroform	0.0028	0.022	2.1E-09	1.7E-07	2.6E-10	6.2E-08	5.4E-10	5.2E-08	0.081	4E-11	4E-09
PAHs (carcinogenic)	1.9	74	1.4E-06	5.6E-04	1.7E-07	2.1E-04	3.5E-07	1.8E-04	11.5	4E-06	2E-03
Tetrachloroethene	0.0074	2.9	5.6E-09	2.2E-05	6.9E-10	8.0E-06	1.4E-09	8.6E-06	0.051	9E-11	4E-07
Trichloroethene	0.014	7.7	9.1E-09	5.8E-05	1.1E-09	2.2E-05	2.3E-10	1.8E-05	0.011	3E-12	2E-07
Total										4E-06	2E-03

B. NONCARCINOGENS

Chemical	Soil Concentrations (mg/kg)		Quantity of Chemical Ingested (mg/kg/day)		Quantity of Chemical Absorbed Dermally (mg/kg/day)		Chronic Daily Intake Averaged Over Exposure Period		Risk Reference Dose	Risk (Upperbound)	
	Average Case	Maximum Plausible Case	Average Case	Maximum Plausible Case	Average Case	Maximum Plausible Case	Average Case	Maximum Plausible Case		Average Case	Maximum Plausible Case
Antimony	5.3	73	4.2E-06	5.9E-04	NEG	NEG	4.2E-06	5.5E-04	0.0004	1E-02	1E+00
Bis(2-ethylhexyl)phthalate	NR	74	NA	5.6E-04	NA	2.1E-04	NA	7.7E-04	0.02	NA	4E-02
Cadmium	0.49	200	3.7E-07	1.5E-03	NEG	NEG	3.7E-07	1.5E-03	0.029	1E-05	5E-02
Chloroform	NR	0.022	NA	1.7E-07	NA	6.2E-08	NA	2.3E-07	0.01	NA	2E-05
Chromium (hexavalent)	0.54	5.5	3.8E-07	4.2E-05	NEG	NEG	3.8E-07	4.2E-05	0.005	8E-05	8E-03
Copper	31	4200	2.4E-05	3.1E-02	NEG	NEG	2.4E-05	3.1E-02	0.037	6E-04	8E-01
Cyanide	0.79	500	5.9E-07	2.3E-03	NEG	NEG	5.9E-07	2.3E-03	0.029	2E-05	8E-02
trans-1,2-Dichloroethene	NR	0.22	NA	1.7E-06	NA	6.2E-07	NA	2.3E-06	0.01	NA	2E-04
Di-n-butyl phthalate	NR	0.77	NA	5.8E-06	NA	2.2E-06	NA	8.0E-06	0.1	NA	8E-05
Lead	9.6	700	7.6E-06	5.9E-03	NEG	NEG	7.6E-06	5.9E-03	0.0014	5E-03	4E00

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TABLE 10

DAILY INTAKES AND RISKS ASSOCIATED WITH DIRECT CONTACT TO SOILS EAST OF THE BIKE PATH DEREVAL SITE, FRANKLIN, NEW JERSEY

Chemical	Soil Concentrations (mg/kg)		Quantity of Chemical Ingested (mg/kg/day)		Quantity of Chemical Absorbed Dermally (mg/kg/day)		Chronic Daily Intake Averaged Over Exposure Period		Risk Reference Dose	Risk (Upperbound)	
	Average Case	Maximum Plausible Case	Average Case	Maximum Plausible Case	Average Case	Maximum Plausible Case	Average Case	Maximum Plausible Case		Average Case	Maximum Plausible Case
Manganese	87	1200	6.7E-05	9.1E-03	NEG	NEG	6.7E-05	9.1E-03	0.2	3E-04	5E-02
Mercury	0.02	2.9	1.5E-08	2.2E-05	NEG	NEG	1.5E-08	2.2E-05	0.0016	1E-05	2E-02
Phenol	NR	3.6	NQ	2.7E-05	NQ	1.0E-05	NQ	3.7E-05	0.04	NQ	9E-04
Tetrachloroethene	0.0074	2.9	5.6E-09	2.2E-05	6.9E-10	8.0E-06	6.3E-09	3.0E-05	0.02	3E-07	2E-03
Toluene	0.018	4.9	1.4E-08	3.7E-05	1.7E-09	1.4E-05	1.5E-08	5.1E-05	0.3	5E-08	2E-04
Zinc	60	2580	4.6E-05	1.8E-02	NEG	NEG	4.6E-05	1.8E-02	0.2	2E-04	9E-02
Hazard Index										<1(3E-02)	6E00

NR = Not reported; mean was below CLP detection limit
NQ = Not quantified
NEG = Negligible; dermal absorption of inorganic chemicals from soils is assumed to be negligible

TABLE 11

DAILY INTAKES AND RISKS ASSOCIATED WITH DIRECT CONTACT TO SOILS WEST OF AND INCLUDING THE BIKE PATH DEREWAL SITE, FRENCHTOWN, NEW JERSEY

A. CARCINOGENS

Chemical	Soil Concentrations (mg/kg)		Quantity of Chemical Ingested (mg/kg/day)		Quantity of Chemical Absorbed Dermally (mg/kg/day)		Chronic Daily Intake Prorated Over 70-Year Lifetime		Potency Factor (mg/kg/day)-1	Risk (Upperbound)	
	Average Case	Maximum Plausible Case	Average Case	Maximum Plausible Case	Average Case	Maximum Plausible Case	Average Case	Maximum Plausible Case		Average Case	Maximum Plausible Case
Bis(2-ethylhexyl)phthalate	0.34	11	3.3E-08	7.7E-06	8.3E-09	5.9E-06	5.9E-09	1.9E-06	0.00068	4E-12	1E-09
Chloroform	NR	0.018	NQ	1.3E-08	NQ	9.6E-09	NQ	3.2E-09	0.081	NQ	3E-10
DDE + DDI	0.48	0.15	3.9E-08	1.0E-07	9.9E-09	7.8E-08	7.0E-09	2.6E-08	0.34	2E-09	9E-09
Methylene chloride	0.015	1.3	1.5E-09	9.1E-07	3.7E-10	6.9E-07	2.6E-10	2.3E-07	0.0075	2E-12	2E-09
PAHs (carcinogenic)	1.7	32	1.7E-07	2.2E-05	4.2E-08	1.7E-05	3.0E-08	5.6E-06	11.5	3E-07	6E-05
Tetrachloroethene	0.093	1	9.1E-09	7.0E-07	2.3E-09	5.3E-07	1.6E-09	1.8E-07	0.051	8E-11	9E-09
Trichloroethene	0.048	0.54	4.7E-09	3.8E-07	1.2E-09	2.9E-07	8.4E-10	9.5E-08	0.011	9E-12	1E-09
Total										3E-07	6E-05

B. NONCARCINOGENS

Chemical	Soil Concentrations (mg/kg)		Quantity of Chemical Ingested (mg/kg/day)		Quantity of Chemical Absorbed Dermally (mg/kg/day)		Chronic Daily Intake Averaged Over Exposure Period		Risk Reference Dose	Risk (Upperbound)	
	Average Case	Maximum Plausible Case	Average Case	Maximum Plausible Case	Average Case	Maximum Plausible Case	Average Case	Maximum Plausible Case		Average Case	Maximum Plausible Case
Antimony	11	74	1.1E-06	5.2E-05	NEG	NEG	1.1E-06	5.2E-05	0.0004	3E-03	1E-01
Barium	210	1500	2.0E-05	1.0E-03	NEG	NEG	2.0E-05	1.0E-03	0.05	4E-04	2E-02
Beryllium	0.09	1.9	8.7E-08	1.3E-06	NEG	NEG	8.7E-08	1.3E-06	0.005	2E-05	3E-04
Bis(2-ethylhexyl)phthalate	0.34	11	3.3E-08	7.7E-06	8.3E-09	5.9E-06	4.1E-08	1.4E-05	0.02	2E-06	7E-04
Cadmium	0.82	10	8.0E-08	7.0E-06	NEG	NEG	8.0E-08	7.0E-06	0.0029	3E-05	2E-03
Chloroform	NR	0.018	NQ	1.3E-08	NQ	9.6E-09	NQ	2.2E-08	0.01	NQ	2E-06
Chromium	16	100	1.6E-06	7.0E-05	NEG	NEG	1.6E-06	7.0E-05	0.005	3E-04	1E-02
Copper	55	180	5.4E-06	1.3E-04	NEG	NEG	5.4E-06	1.3E-04	0.04	1E-04	3E-03
Cyanide	1.5	11	1.5E-07	7.7E-06	NEG	NEG	1.5E-07	7.7E-06	0.029	5E-06	3E-04

TABLE 11

DAILY INTAKES AND RISKS ASSOCIATED WITH DIRECT CONTACT TO SOILS WEST OF AND INCLUDING THE BIKE PATH DEREVAL SITE, FRENCHTOWN, NEW JERSEY

Chemical	Soil Concentrations (mg/kg)		Quantity of Chemical Ingested (mg/kg/day)		Quantity of Chemical Absorbed Dermally (mg/kg/day)		Chronic Daily Intake Averaged Over Exposure Period		Risk Reference Dose	Risk (Upperbound)	
	Average Case	Maximum Plausible Case	Average Case	Maximum Plausible Case	Average Case	Maximum Plausible Case	Average Case	Maximum Plausible Case		Average Case	Maximum Plausible Case
Di-n-butyl phthalate	0.23	1.3	2.3E-08	9.1E-07	5.8E-09	6.9E-07	2.9E-08	1.6E-06	0.1	3E-07	2E-05
Lead	20	200	1.9E-06	1.4E-04	NEG	NEG	1.9E-06	1.4E-04	0.0014	1E-03	1E-01
Manganese	260	3500	2.5E-05	2.4E-03	NEG	NEG	2.5E-05	2.4E-03	0.2	1E-04	1E-02
Mercury	NR	0.5	NQ	3.5E-07	NEG	NEG	NQ	3.5E-07	0.0014	NQ	2E-04
Methylene chloride	0.015	1.3	1.5E-09	9.1E-07	3.7E-10	6.9E-07	1.8E-09	1.6E-06	0.06	3E-08	3E-05
Nickel	23	84	2.3E-06	5.9E-05	NEG	NEG	2.3E-06	5.9E-05	0.01	2E-04	6E-03
Selenium	0.43	7.1	4.2E-08	5.0E-06	NEG	NEG	4.2E-08	5.0E-06	0.003	1E-05	2E-03
Silver	1.2	12	1.2E-07	8.4E-06	NEG	NEG	1.2E-07	8.4E-06	0.003	4E-05	3E-03
Tetrachloroethene	0.093	1	9.1E-09	7.0E-07	2.3E-09	5.3E-07	1.1E-08	1.2E-06	0.02	6E-07	6E-05
Toluene	0.16	4.9	1.5E-08	3.4E-06	3.9E-09	2.6E-06	1.9E-08	3.0E-06	0.3	6E-08	2E-05
1,1,1-Trichloroethane	0.0053	0.026	5.2E-10	1.8E-08	1.3E-10	1.4E-08	6.5E-10	3.2E-07	0.086	8E-09	4E-06
Zinc	190	5100	1.9E-05	3.5E-03	NEG	NEG	1.9E-05	3.5E-03	0.21	9E-05	2E-02
Hazard Index										<1(5E-03)	<1(3E-01)

NR = Not reported; mean was below CLP detection limit
NQ = Not quantified
NEG = Negligible; dermal absorption of inorganic chemicals from soils is assumed to be negligible

terms of the toxicity of contaminants at various concentrations. Only a qualitative assessment was performed, noting stressed vegetation in areas on the site. The geometric mean concentrations of cobalt and zinc in the soil in the wooded areas exceed levels toxic to rice and barley in acute toxicity studies and are at concentrations that may be toxic to plant species which occur in the area of the site. Since the area west of the bike path is vegetated and even heavily wooded, it is likely that the presence of contaminants in that area does not pose significant risks to these plants and trees.

The site is not within the coastal zone as defined by the State of New Jersey. Additionally, there are no federally designated wild and scenic rivers and there are no significant agricultural lands in the vicinity of the site. The project area is sensitive for the discovery of cultural resources. In particular, the area adjacent to the Delaware River is extremely sensitive with respect to prehistoric occupation.

EPA consulted with the U.S. Fish and Wildlife Service (FWS) with regard to the presence of federally listed or proposed endangered and threatened species within the study area of the site. The FWS responded that wintering bald eagles (Haliaeetus leucocephalus) are known to utilize the Delaware River; however, occurrence in the project vicinity is not well documented. According to the FWS, aside from this species and occasional transient species, no other federally listed or proposed species are known to exist at this site. Similarly, EPA consulted with the National Marine Fisheries Service (NMFS) with regard to the presence of shortnose sturgeon (Acipenser brevirostrum) in the vicinity of the site. EPA also requested advice from the NMFS on whether remedial action at the site may result in impacts to this species. The NMFS responded that currently available information shows the upper range limits of shortnose sturgeon to be just above Lambertville, New Jersey, approximately 24 miles downstream from the DeRewal site, and indicated that it is unlikely that the site affects these fish over such a distance.

Conclusion

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF ALTERNATIVES

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requires that each selected site remedy be protective of human health and the environment, comply with applicable or relevant and appropriate requirements (ARARs), utilize permanent solutions and alternative treatment

technologies or resource recovery technologies to the maximum extent practicable, and be cost effective.

The FS evaluated, in detail, five alternatives for remediating the soil and three alternatives for remediating the shallow water-bearing zone. Alternative S-1 has been further separated into two components.

Soil Remediation Alternatives

S-1(a) No Action

Estimated Construction Cost:	0
Estimated Operation & Maintenance Cost:	0
Estimated Total Present Worth:	0
Estimated Time to Completion:	Not Applicable

The Superfund program requires that the "no action" alternative be evaluated at every site to establish a baseline for comparison. Under this alternative, EPA would take no further action to address the contamination at the site.

S-1(b) Limited Action

Estimated Construction Cost:	$31,000
Estimated Operation & Maintenance Cost:	$476,000
Estimated Total Present Worth:	$507,000
Estimated Time to Completion:	6 Months

Under this alternative, no remedial action would be taken. On-site residents would be permanently relocated to a residence mutually acceptable to both the property owner and EPA, deed restrictions on future use of the property would be sought, a fence enclosing the entire area formerly leased by Mr. DeRewal would be installed, and periodic monitoring of site groundwater, surface soil, surface water and sediments would be performed.

S-2 Excavation, On-site Thermal Treatment and On-site Solidification/Stabilization

Estimated Construction Cost:	$4,224,000
Estimated Operation & Maintenance Cost:	$180,000
Estimated Total Present Worth:	$4,404,000
Estimated Time to Completion:	12 Months

Under this alternative, an estimated total of 8,000 cubic yards of contaminated soil would be excavated. A mobile thermal treatment unit would be brought to the site to destroy the 2,100 cubic yards of organic-contaminated soil. Following thermal treatment, the heated soil/ash residue would be combined with the remaining 5,900 cubic yards of inorganic-contaminated soil and solidified on-site. The soil and binder material could be added

and mixed in conventional cement mixing or rotary drum equipment. The resulting material would be a thick elastic slurry, which sets as dense and concrete-like material. The solidified mass would be returned to the excavated area, and a vegetative cover would be placed over it to promote surface water runoff and reduce leaching due to infiltration.

S-3 Excavation, Off-site Thermal Treatment and On-site Solidification/Stabilization

Estimated Construction Cost: $9,956,000
Estimated Operation & Maintenance Cost: $160,000
Estimated Total Present Worth: $10,116,000
Estimated Time to Completion: 7 Months

This alternative is similar to the one described above, except that the 2,100 cubic yards of organic-contaminated soil would be thermally treated and disposed of at an off-site facility. It is anticipated that a total of 126 trucks with a 20 cubic yard capacity would be required for hauling.

S-4 Excavation and On-site Solidification/Stabilization

Estimated Construction Cost: $2,252,000
Estimated Operation & Maintenance Cost: $190,000
Estimated Total Present Worth: $2,442,000
Estimated Time to Completion: 8 Months

This alternative is similar to the previous two alternatives, except that the organic-contaminated soil would not be thermally treated. Instead, all 8,000 cubic yards of contaminated soil would be solidified on-site.

S-5 Off-site Disposal

Estimated Construction Cost: $6,115,000
Estimated Operation & Maintenance Cost: $110,000
Estimated Total Present Worth: $6,225,000
Estimated Time to Completion: 5 Months

This alternative provides for remediation of all of the 8,000 cubic yards of contaminated soil at the site, through off-site disposal at a RCRA-permitted, Subtitle C landfill. It is anticipated that a total of 480 trucks with a 20 cubic yard capacity would be required to haul this material. Before hauling, the 2,100 cubic yards of organic-contaminated soil would be mixed in an on-site chamber to induce volatilization. The vapor/dust emissions would be controlled.

Shallow Groundwater Remediation Alternatives

GW-1 No Action

Under this alternative, no remedial action would be taken. The shallow groundwater above bedrock, as well as the deep bedrock groundwater, would be monitored annually. Public health assessments would be performed periodically. The costs for this alternative are included in the Limited Action (S-1[b]) alternative for soil remediation.

GW-2 Extraction, On-site Storage, On-site Treatment and Discharge to the Delaware River

Estimated Construction Cost:	$21,600
Estimated Operation & Maintenance Cost:	$730,300
Estimated Time to Completion:	2 Years

This alternative provides for the complete treatment of the shallow groundwater above bedrock. The shallow groundwater would be extracted using a wellpoint dewatering system with vacuum pumps or other suitable pumps at the surface. The treatment system would include a 10,000 gallon storage tank, an air stripping column and a carbon adsorption unit. Treated groundwater would be discharged to the Delaware River through an underground discharge pipe. For the purpose of estimating the cost of this alternative, and the alternative which follows, it is assumed that removal of 10 pore volumes (approximately 1,000,000 gallons) would be required for remediation. An extraction rate of 1 gallon per minute is also estimated.

GW-3 Extraction, On-site Storage and Off-site Disposal

Estimated Construction Cost:	$8,500
Estimated Operation & Maintenance Cost:	$684,400
Estimated Time to Completion:	2 Years

Under this alternative, the shallow groundwater would be extracted by a wellpoint dewatering system as described above. Extracted water would be collected in an on-site storage tank with a capacity of 5,000 gallons. Water would be pumped from the storage tank into a tanker truck for hauling to an industrial wastewater treatment facility (IWTF). It is anticipated that only one tanker truck with a capacity of 5,000 gallons would be rented.

SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

Pursuant to CERCLA, as amended, EPA must evaluate each alternative with respect to nine criteria. These criteria were developed to address the requirements of Section 121 of SARA.

The nine criteria are: overall protection; compliance with ARARs; long-term effectiveness and permanence; reduction of toxicity, mobility, or volume; short-term effectiveness; implementability; cost; State acceptance and community acceptance. The discussion which follows provides an analysis, relative to these criteria, of all of the alternatives under consideration for cleanup of soil and shallow groundwater at the DeRewal Chemical Company site.

Overall Protection

Soil Remediation Alternatives

All of the alternatives, with the exception of S-1(a) and S-1(b), would provide adequate protection of human health and the environment by eliminating, reducing, or controlling risk through treatment, engineering controls, or institutional controls. Alternative S-5 would provide the greatest overall protection at the site; however, the health risks would be transferred to the designated disposal facility. Alternatives S-2 and S-3 would remove the organic contaminants in the soil, which will eliminate long-term risks due to dermal contact, ingestion and inhalation, and stabilize the remaining wastes to minimize the potential release into the environment. S-4 is less protective than the selected alternative because the organic contaminants would not be destroyed.

Because S-1(a) and S-1(b) are not protective of human health and the environment, they are not considered further in this analysis as options for the site.

Shallow Groundwater Remediation Alternatives

Both alternatives which actively remediate the shallow groundwater are protective of human health and the environment. GW-1 is not protective and, therefore, is not considered further in this analysis as an option for the site.

Compliance with ARARs

Soil Remediation Alternatives

All active alternatives would meet applicable or relevant and appropriate requirements of Federal and State environmental laws. Off-site disposal is the least preferred alternative based on SARA. Emissions from the on-site thermal treatment unit would be monitored and controlled. It is anticipated that the solidified mass resulting from Alternatives S-2, S-3 and S-4 would be returned to the excavated area and that a vegetative cover would be placed over it.

During the Remedial Design, studies will be undertaken to determine whether returning the solidified material to the excavation will comply with then existing New Jersey Solid Waste Regulations. If it is determined these regulations would prohibit the return of the solidified material, the contaminated soil will be disposed of off-site in accordance with applicable regulations. In addition, each of the alternatives would require the preparation of a cultural resources survey to ensure compliance with the National Historic Preservation Act. No waiver from ARARs is anticipated to implement any of the active cleanup options.

Shallow Groundwater Remediation Alternatives

Alternatives GW-2 and GW-3 would meet applicable or relevant and appropriate requirements of Federal and State environmental laws. Although inorganic contaminants were present in the bedrock aquifer above ARARs, it is anticipated that remediation of the soil and shallow groundwater above bedrock will result in these contaminants being reduced to ARARs or naturally occurring background levels. The bedrock aquifer will be periodically monitored prior to the start of, as well as during and after, the remedial action. Monitoring of the bedrock aquifer after the completion of the cleanup will indicate the need for any further action. No waiver from ARARs is necessary to implement any of the active cleanup options.

Long-term Effectiveness and Permanence

Soil Remediation Alternatives

Implementation of Alternative S-2 would result in minimal risks remaining at the site. Most of the organic contaminants would be destroyed by the thermal treatment process, and the risk of future groundwater contamination would be minimized by the solidification of the soil/ash residue and inorganically contaminated soil. Implementation of S-3 would result in a similar magnitude of residual risk; it differs from S-2 in that the organic contaminants would be removed from the site before being destroyed and the resulting soil/ash residue would be disposed of off-site. Alternative S-4 would not reduce the inherent hazards posed by the organic contaminants to the extent that S-2 would, since the organic contaminants would be solidified rather than destroyed. Implementation of Alternative S-5 would result in the contaminants being removed; therefore, the risk of future migration of contaminants to the shallow water-bearing zone would be eliminated.

Shallow Groundwater Remediation Alternatives

Both Alternatives GW-2 and GW-3 would result in minimal residual risk. GW-3 poses no technological concerns. Under GW-2, however, required process efficiencies would need to be maintained prior to discharge to the Delaware River.

Reduction of Toxicity, Mobility, or Volume

Soil Remediation Alternatives

Alternative S-2 utilizes thermal treatment and on-site solidification/stabilization to clean up the contaminated soil at the site. The toxicity, mobility and volume of soil contaminants would be reduced. The process would be irreversible for organics, and nearly irreversible for inorganics. Immobilized inorganics at concentrations above NJDEP action levels would remain in the soil.

S-3 would achieve similar reduction in toxicity, mobility and volume. Under S-3, the soil contaminated with organics would be removed from the site for off-site thermal treatment. S-4 would reduce only the mobility of the soil contaminants. Alternative S-5 would reduce toxicity, mobility and volume of soil contaminants at the site. However, contaminated soil would be disposed of at the off-site landfill.

Shallow Groundwater Remediation Alternatives

Under Alternative GW-3, the extracted shallow groundwater would be transported to, treated, and disposed of, at an industrial wastewater treatment facility, resulting in reductions in toxicity and volume of contaminants. GW-2 would reduce toxicity and volume of contaminants through on-site treatment. Under GW-2, treated water would be discharged to the Delaware River.

Short-term Effectiveness

Soil Remediation Alternatives

It is estimated that implementation of Alternative S-2 would take 12 months to complete. Similarly, S-3 would require 7 months, S-4, 8 months and S-5, 5 months to complete.

For all of the active alternatives, the potential for erosion and transport of contaminated soil into surface water or areas off-site would be minimized by standard erosion control methods. Dust suppression technologies would be used to minimize or eliminate fugitive emissions. Appropriate personnel protection equipment would be used.

Alternative S-2 presents a slight increase in risk resulting from emissions; these, however, can be minimized through careful management of the trial run of the thermal treatment unit, and through monitoring of the thermal treatment unit. The duration of the trial run would be approximately a few hours, and would not be allowed to continue if unsafe emissions persist. The actual thermal treatment should take about four weeks. For all of the active alternatives, there is a risk to workers associated with excavation. This risk, as mentioned, would be minimized through the use of personnel protection equipment. Under S-3, there is also a risk associated with the transport of contaminated soil to the off-site thermal treatment unit.

Shallow Groundwater Remediation Alternatives

For both alternatives, the remedial response objectives would be met on removal of contaminated water from shallow soil. Both alternatives are estimated to take two years to complete.

Under Alternative GW-3, there is a low risk involved during the transport of contaminated water. Under GW-2, personnel protection equipment may be necessary for worker protection. Also, proper air pollution controls would be necessary during air stripping.

Implementability

Soil Remediation Alternatives

The alternatives have few associated administrative difficulties which could delay implementation. The remedies have been used successfully to address similar contaminants at other Superfund sites, and the skilled workers needed to implement the remedies are readily available in the area. The on-site thermal treatment unit will meet permit requirements. There is currently only one company with a mobile thermal treatment unit of appropriate size known to be available for the job. However, it is anticipated that other companies may be available when the remedial action is implemented. Also, for all alternatives, deed restrictions on the future use of the property would be sought. For Alternative S-1(b), deed restrictions are necessary to protect the public from the contaminated material. For Alternatives S-2, S-3 and S-4, however, deed restrictions will be used as a precautionary measure to ensure the integrity of the concrete-like material remaining on-site. During remedial action, on-site residents may be temporarily relocated to a location mutually acceptable to them and EPA.

Shallow Groundwater Remediation Alternatives

There are no technical design concerns for Alternative GW-3. Tanker trucks are readily available to rent. Permits are

required for transportation of contaminated water, and for off-site disposal. Off-site disposal facilities are available within 100 miles of the site.

For GW-2, stripping and carbon adsorption units are readily available for rent, and can be easily operated and maintained. Effluent concentrations would need to be monitored prior to discharge to the Delaware River. The underground discharge pipe would have to be constructed. The substantive requirements of a permit for surface water discharge would need to be met.

Cost

Soil Remediation Alternatives

The present worth cost of Alternative S-2 is $4,404,000. The lowest-cost active alternative is S-4 at $2,442,000. Alternative S-3 has a present worth cost of $10,116,000, and Alternative S-5 has a present worth cost of $6,225,000. Should part or all of the treated material resulting in Alternatives S-2, S-3, and S-4 need to be disposed of off-site, the estimated cost of these remedies could be increased by up to $3.4 million.

Shallow Groundwater Remediation Alternatives

The estimated total cost of Alternative GW-3 is $693,000. Alternative GW-2 has an estimated total cost of $752,000. The Operation and Maintenance costs associated with the active ground-water cleanup alternatives are consistent with Section 104.(a)(c)(6) of CERCLA.

State Acceptance

The State of New Jersey supports the remedial actions indicated in the selected remedy.

Community Acceptance

Issues raised at the public meeting and during the public comment period are addressed in the Responsiveness Summary section of this ROD.

SELECTED REMEDY

The Environmental Protection Agency has been directed by Congress in Section 121(b) of CERCLA, as amended, to select remedial actions which utilize permanent solutions and alternative treatment technologies or resource recovery options to the maximum extent practicable. In addition, the Agency prefers remedial actions that permanently and significantly reduce the mobility, toxicity or volume of site wastes.

After careful review and evaluation of the alternatives evaluated in detail in the feasibility study, EPA presented Alternative S-2, excavation, on-site thermal treatment of organic-contaminated soil with on-site solidification/stabilization of the treated soil/ash residue and all other contaminated soil, and Alternative GW-3, extraction of shallow groundwater, on-site storage and off-site disposal at an industrial wastewater treatment facility, to the public as the preferred remedy for the soil and shallow groundwater, respectively, at the DeRewal Chemical Company site. The input received during the public comment period, consisting primarily of questions and statements submitted at the public meeting held on August 10, 1989, is presented in the attached Responsiveness Summary. Public comments received encompassed a range of issues but did not necessitate any changes in the preferred alternatives for the site. Accordingly, the preferred alternatives were selected by EPA as the remedial solution for the site. Some additional activities will be performed during the remedial design process and remedial action. These activities are described and justified as follows:

The bedrock aquifer will be periodically monitored prior to the start of the remedial action, as well as during and after the remedial action. Monitoring of the bedrock aquifer after the completion of the clean-up will indicate the need for any further action.

Soil samples will be taken at varying depths from under the building formerly occupied by DeRewal Chemical Company. The walls of this building will also be sampled. The soil investigation results show that there is contamination surrounding the garage, a small fish pond on the site, and the building formerly occupied by DeRewal Chemical Company. Since contamination is surrounding these structures, it is possible that contamination exists beneath them. Therefore, the selected remedies may need to include the areas occupied by these structures. Investigation of the structures during the design phase is also necessary to determine the necessity of demolition.

On-site residents will have to be temporarily relocated. The portions of the remedial action which will necessitate re-location will be determined during the remedial design phase of the project. EPA will consult with other agencies on this task, such as the Agency for Toxic Substances and Disease Registry (ATSDR) or the Federal Emergency Management Agency (FEMA), as appropriate.

It is anticipated that the solidified mass resulting from the remedy would be returned to the excavated area and that a vegetative cover would be placed over it. The solidified mass

placed at the site is expected to be protective of human health and the environment.

During the Remedial Design, studies will be undertaken to determine whether returning the solidified material to the excavation will comply with then existing New Jersey Solid Waste Regulations. If it is determined that these regulations would prohibit the return of the solidified material, the contaminated soil will be disposed of off-site in accordance with applicable regulations. Appropriate deed restrictions on future use of the property will be sought, as a precautionary measure, to ensure the integrity of the solidified mass. The solidified mass would be disposed of off-site at an appropriate landfill if the tests indicate the need for this.

A cultural resources survey will be prepared to ensure compliance with the National Historic Preservation Act.

There will be additional sampling of the soil on-site to verify the extent of excavation.

Air emissions generated during execution of the remedial action will be monitored and controlled.

A treatment system will be placed at the on-site residential well as a protective measure on an interim basis.

Any buried drums discovered during remediation will be disposed of properly.

Any significant surficial debris west of the bike path at the site at the date of this ROD will be removed.

After remediation of the site, the bike path will be restored to the present or equivalent condition.

STATUTORY DETERMINATIONS

Superfund remedy selection is based on the Superfund Amendments and Reauthorization Act of 1986 and the regulations contained in the National Contingency Plan. EPA's primary responsibility at Superfund sites is to undertake remedial actions that achieve adequate protection of human health and the environment. Additionally, several other statutory requirements and preferences have been established. These specify that, when complete, the selected remedy must comply with ARARs, unless a statutory waiver is justified. The remedy must also be cost-effective and utilize permanent solutions and alternative treatment or resource recovery technologies to the maximum extent practicable. Finally, there is a preference for remedies which employ treatment that permanently and significantly reduce the

toxicity, mobility, or volume of hazardous wastes as their principal element. The following sections discuss how the remedy selected for the DeRewal Chemical Company site meets these requirements and preferences.

Protection of Human Health and the Environment

The selected remedy protects human health and the environment through the excavation, on-site thermal treatment of organic-contaminated soil, and on-site solidification/stabilization of the treated soil/ash residue and all other contaminated soil, and through the extraction of shallow groundwater, on-site storage and off-site disposal of the extracted groundwater at an industrial wastewater treatment facility.

On-site thermal treatment will eliminate the threat of exposure from direct contact to carcinogens. The current risks associated with these carcinogens, under the conditions and assumptions of the plausible maximum exposure scenario, is $2x10^{-3}$ (upperbound). By thermally treating the organic-contaminated soil on-site, the cancer risk will be reduced to the range of acceptable exposure levels of between 10^{-4} and 10^{-7}. On-site solidification/ stabilization of the soil/ash residue and inorganic-contaminated soil effectively eliminates the potential for migration of any remaining contaminants to the shallow water-bearing zone.

Extraction of shallow groundwater, on-site storage and off-site disposal at an industrial wastewater treatment facility will significantly reduce the threat of exposure to groundwater contamination. The current risk (upperbound) associated with this pathway is $3x10^{-5}$, which is in the range of acceptable exposure levels. However, cleanup is warranted because contaminants are present at concentrations exceeding SDWA MCLs. In addition, it effectively eliminates the potential for migration of contaminants from the shallow water-bearing zone to the deeper bedrock aquifer at the site.

There are no short-term threats associated with the selected remedy which cannot be readily controlled. In addition, no adverse cross-media impacts are expected from the remedy.

Utilization of Permanent Solutions and Alternative Treatment or Resource Recovery Technologies to the Maximum Extent Practicable

EPA and the State of New Jersey have determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner for the DeRewal Chemical Company site. Of those alternatives that are protective of human health and comply with ARARs, EPA and the State have determined that the selected remedy provides the best balance of tradeoffs in terms of long-term

effectiveness and permanence, reduction in toxicity, mobility, or volume achieved through treatment, short-term effectiveness, implementability, cost, and State and community acceptance.

The selected remedy for soil cleanup does present a slight short-term risk increase resulting from emissions during remedial action; these, however, will be minimized through careful management of the trial run of the thermal treatment unit and air monitoring throughout remediation. Under the selected groundwater remediation alternative, there is a low risk involved during transport of contaminated water. There are, however, no technical design concerns for the selected alternative.

Cost Effectiveness

Of the alternatives which most effectively address the threats posed by the contamination at the site, the selected alternatives for soil and shallow groundwater remediation afford the highest level of overall effectiveness proportional to their cost. The selected alternatives are determined to be cost-effective because they provide the highest degree of protectiveness among the alternatives evaluated, while representing cost value. A detailed breakdown of the costs associated with the selected remedies are shown in Table 12.

Compliance with Applicable or Relevant and Appropriate Requirements

The selected remedy will comply with all applicable or relevant and appropriate action-, contaminant-, and location-specific requirements (ARARs). The ARARs are presented below.

Action-Specific

The selected soil remediation alternative will comply with action-specific ARARs. Soil containing contaminant concentrations above the NJDEP Action Levels will be excavated. Organic contaminants will be destroyed by thermal treatment. The soil/ash residue and the metal-contaminated soil will be solidified and stabilized on-site. Although the solidified mass may contain inorganics at concentrations above the NJDEP Action Levels, it will be tested for leachability prior to disposal.

No RCRA action-specific ARARs are triggered by the remedy, since the waste is not a RCRA waste. Therefore, the RCRA Land Disposal Restrictions do not apply.

Stack emissions would conform to the provisions of the Clean Air Act. This will be accomplished through the installation of appropriate air pollution control equipment. Occupational Safety and Health Administration requirements would be complied with during implementation.

TABLE 12

COST SUMMARY FOR THE SELECTED REMEDIES

SOIL REMEDIAL ACTION

Excavation, Treatment and On-site Disposal	
CAPITAL COSTS:	$ 4,224,000
OPERATION AND MAINTENANCE	180,000
SUBTOTAL	$ 4,404,000*

GROUNDWATER REMEDIAL ACTION

Extraction, On-site Storage and Off-site Disposal	
SUBTOTAL	$ 693,000
TOTAL REMEDIAL ACTION COST	$ 5,097,000

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* Should part or all of the treated material resulting in this alternatives need to be disposed of off-site, the estimated cost of this remedy could be increased by up to $3.4 million.

With respect to State action-specific ARARs, the thermal treatment unit and the solidification units will be designed, constructed and operated to meet with the Air Pollution Control and the Noise Pollution Control Act requirements.

The selected remedy for shallow groundwater will also be in compliance with all the Federal and State ARARs. The residual water remaining in the shallow water-bearing zone will meet the NJ SDWA MCLs. Action-specific ARARs with respect to the transport of contaminated groundwater to the IWTF located off-site will be followed.

Contaminant-Specific

NJDEP Action Levels (June 1, 1988) will be used as soil cleanup criteria for metals, total volatile organics and total semi-volatile organics (includes PAHs). MCLs under the January 1989 amendments to the New Jersey Safe Drinking Water Act will be used as cleanup criteria for the shallow groundwater.

Location-Specific

The site is not within the coastal zone as defined by the State of New Jersey. Additionally, there are no federally designated wild and scenic rivers and there are no significant agricultural lands in the vicinity of the site. The project area is sensitive for the discovery of cultural resources. In particular, the area adjacent to the Delaware River is extremely sensitive with respect to prehistoric occupation. Therefore, as discussed in the previous section, a cultural resources survey will be prepared. The 100-year floodplain will be considered for on-site solidification/stabilization, though it is expected that the floodplain restrictions would not apply.

Preference for Treatment as a Principal Element

By thermally treating organic-contaminated soil on-site, and solidifying the soil/ash residue and inorganic-contaminated soil, and by extracting the shallow groundwater for off-site disposal at an industrial wastewater treatment facility, the selected remedy addresses the threats posed by the site through the use of treatment technologies. Therefore, the statutory preference for remedies that employ treatment as a principal element is satisfied.

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
CHRISTOPHER J. DAGGETT, COMMISSIONER
CN 402
TRENTON, N.J. 08625
609-292-2885

RCVD 9/28

William J. Muszynski, P.E.
Acting Regional Administrator
U.S. Environmental Protection Agency
Region II
26 Federal Plaza
New York, N. Y. 10278

Dear Mr. Muszynski:

A draft Record of Decision (ROD) has been prepared by the United States Environmental Protection Agency (USEPA), in accordance with the requirements of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), for the DeRewal Chemical Company site in Kingwood Township, Hunterdon County, New Jersey. The State of New Jersey concurs with the remedy outlined below.

Description of the Selected Remedy

The selected remedy addresses contaminated soil and contaminated groundwater in the shallow aquifer underlying the site. In addition, the remedy includes post-remedial action monitoring of the deeper bedrock aquifer.

The major components of the selected remedy include:

- Excavation of soil contaminated with organic and inorganic compounds above action levels;
- On-site thermal treatment of the organic-contaminated soil;
- On-site solidification/stabilization of the thermally treated soil and the remaining inorganic-contaminated soil;
- Extraction of shallow groundwater contaminated above drinking water standards, on-site storage, and off-site disposal at an approved industrial wastewater treatment facility;
- Provision of a treatment system for the on-site residential well;
- Appropriate environmental monitoring to ensure the effectiveness of the remedy; and

- Establishment of deed restrictions, as necessary, to ensure the effectiveness of the remedy.

After a review of the final decision document, the State may have additional comments to be addressed by USEPA during remedial design. These comments would not affect our concurrence with the above remedy.

The State of New Jersey appreciates the opportunity to participate in this decision making process and looks forward to future cooperation with USEPA.

Very truly yours,

Christopher J. Daggett, Commissioner
for Department of Environmental Protection

DEREWAL CHEMICAL COMPANY SITE
KINGWOOD TOWNSHIP, NEW JERSEY

RESPONSIVENESS SUMMARY

I. OVERVIEW

The Proposed Plan for the DeRewal Chemical Company site was well-received by the public. No objections to the Proposed Plan were raised at a briefing for interested local officials and at the public meeting. The selected remedy outlined in the Record of Decision is the same as the preferred remedy described in the Proposed Plan.

II. BACKGROUND ON COMMUNITY INVOLVEMENT

Community concern regarding the DeRewal site has generally been limited. However, the site has received coverage from the local newspapers on several occasions, including during the years when DeRewal Chemical was in business, when the site was proposed for inclusion on the National Priorities List (NPL), and when EPA held a public meeting to announce that a remedial investigation/ feasibility study (RI/FS) would be conducted at the site. There have also been several newspaper articles since the Proposed Plan was released to the public.

As part of the RI/FS, a community relations plan (CRP) was prepared. Issues of community concern which were identified in the CRP included the timely release of site-related information, and the need for investigation of a nearby property which received contaminated soil from the DeRewal site. EPA's efforts to keep the public informed are summarized in Attachment 1.

In 1983, the owner of the area of the site located east of the bike path had approximately 30 tons of soil excavated from that property. The soil was deposited at an open dump located near the Frenchtown Roller Rink, approximately 1/4 mile southeast of the DeRewal Chemical Company site. This area is known as the Pinkerton Dump. The deposited soil from the DeRewal site has since been buried by more recently dumped construction debris and household waste. EPA completed a Preliminary Assessment (PA) of the dump in December 1986 which showed that soil contamination is present. EPA is currently assessing the need for further evaluation of the dump.

The conditions at the DeRewal site have had no known impact on local residential property values. Similarly, the site has had no known impact on the business which borders the site on the north. The contamination has affected the manner in which the owner of the area of the site located east of the bike path can use his property for commercial purposes. During the cleanup of the site, access to the bike path which bisects the site will be restricted.

The impact that the cleanup will have on traffic on New Jersey State Route 29 will be assessed during the design phase of the project.

III. SUMMARY OF PUBLIC COMMENTS AND EPA RESPONSES

COMMENT: What is the status of the investigation of the Pinkerton Dump?

RESPONSE: Preliminary sampling was performed at the Pinkerton Dump. EPA is currently assessing the need for further evaluation of the dump.

COMMENT: Deed restrictions should be established no matter which alternative is chosen.

RESPONSE: EPA agrees that some form of institutional controls should be established.

COMMENT: A desire was expressed for the contaminants to be "detoxified" on-site, as opposed to having contaminants being handled elsewhere.

RESPONSE: EPA's proposed remedy includes on-site treatment of contaminated soil.

COMMENT: Questions were asked about the relocation of the on-site residents.

RESPONSE: The on-site residents will be temporarily relocated to a mutually acceptable location during the appropriate periods of the remedial action.

COMMENT: Is there contamination west of the bike path?

RESPONSE: Contamination is present west of the bike path at levels requiring remediation. Those areas will be included in the remedial action.

COMMENT: Why haven't signs been posted at the site alerting the public that the site is contaminated?

RESPONSE: Signs would have been posted if an immediate health hazard existed, or if people were required to avoid the site. Since these conditions did not apply, signs were not posted.

COMMENT: There was concern about an active non-NPL facility in Kingwood Township.

RESPONSE: Representatives of the NJDEP present at the public meeting indicated that Don Cramer (with the NJDEP Bureau of Discharge Control) can be contacted with regard to the facility.

COMMENT: Mr. DeRewal should pay for the cleanup. There was also concern about sites in Pennsylvania that Mr. DeRewal has been associated with.

RESPONSE: EPA has been conducting enforcement activities for the site, and will continue to do so. The two nearby Superfund sites that Manfred DeRewal has been associated with in Pennsylvania are being investigated by the EPA Regional Office in Philadelphia.

COMMENT: One citizen expressed a preference for Alternative S-4 over S-2.

RESPONSE: Alternative S-4 is not as protective of human health and the environment as S-2 because the organic contaminants would not be thermally treated. Also, Alternative S-2 satisfies the statutory preference for permanent solutions to a greater degree than S-4. Finally, Alternative S-2 provides the best balance among all of the soil remediation alternatives with respect to the nine criteria used to evaluate remedial alternatives.

COMMENT: The owner of the area east of the bike path commented that because his property is part of a Superfund site, he cannot fully utilize it for commercial activities. He offered to sell the property to EPA.

RESPONSE: Issues pertaining to access, relocation, and use will be resolved during remedial design activities. EPA will not purchase the property.

ATTACHMENT 1

COMMUNITY RELATIONS ACTIVITIES FOR THE
DEREWAL CHEMICAL COMPANY SITE

The Community Relations activities conducted to date by the Environmental Protection Agency (EPA) for the DeRewal Chemical Company site have included the following:

I. **PUBLIC MEETING ON March 17, 1986**

At this meeting, EPA's presentation consisted of an overview of the Superfund Program, and a discussion of the Work Plan for the remedial investigation/feasibility study (RI/FS). Prior to this meeting, the two information repositories established for the site were provided with copies of the Work Plan and Community Relations Plan.

II. **PUBLIC COMMENT PERIOD: JULY 28, 1989 - AUGUST 28, 1989**

Comments on any of the remedial alternatives addressed in the Proposed Plan and the RI/FS reports were considered during the public comment period.

III. **BRIEFING FOR INTERESTED LOCAL OFFICIALS ON AUGUST 7, 1989**

The Kingwood Township Committee was briefed at this meeting on the findings of the RI/FS reports and the Proposed Plan. EPA also solicited input on all of the remedial alternatives evaluated for the site. Copies of the RI/FS reports and the Proposed Plan were provided to the information repositories prior to the meeting.

IV. **PUBLIC MEETING ON AUGUST 10, 1989**

At this meeting, EPA again presented the findings of the RI/FS reports and the Proposed Plan, as well as solicited public input.

V. **TELEPHONE CALLS**

Telephone calls were made on a regular basis to key official contacts and interested citizens, including the director of the Hunterdon County Health Department, the Kingwood Township Clerk, and the owner of the area of the site located east of the bike path.